
From: Gray, David
Sent: Thursday, September 7, 2017 8:37 PM
To: Carroll, Craig; Coleman, Sam; Edlund, Carl; Opalski, Dan; Peterson, Mary; Price, Lisa; Smith, Monica; Vargo, Steve
Subject: Arkema Summary Report
Attachments: Arkeman Data Report - Summary.docx; SampleResults_VOCs_20170901.pdf; SampleResults_SVOCs_20170901.pdf; Positive Detections v6.pdf

All – we are prepared to issue data and findings for the Arkema effort.
Here is the draft which we plan to release tomorrow 9/8.

David

EPA has completed its response support to the Crosby Volunteer Fire Department and the Harris County Fire Marshal's Office for the catastrophic event at Arkema. The EPA and the TCEQ provided direct support to incident commander Michael Sims of the Crosby Volunteer Fire Department and Chief Bob Royall of the Harris County Fire Marshal's Office, who are leading a coordinated local, state, and federal effort as part of the Unified Command to control the fire at the Arkema facility in Crosby.

As a result of initial chemical fires while the facility was flooded, EPA has collected downstream surface water runoff samples at four locations outside the evacuation zone, near residential areas.

Six surface water runoff samples were collected on Friday, September 1, 2017 in the vicinity of the Arkema plant in Crosby, Texas. Surface water runoff results were less than the screening levels that would warrant further investigation. Each flood water sample was analyzed for volatile organic chemicals and semi-volatile organic chemicals likely to come from the Arkema plant. No volatile organic chemicals or semi-volatile organic chemicals were detected in the surface water runoff samples. Non-quantifiable and compounds not definitively identified are not reported. It is important to note that chemical analysis alone cannot be used as an indication of water safety. In a flood situation, there are multiple risk factors that can cause harm, industrial chemicals are only one of those risk factors. A copy of the data reports are attached.

EPA sent its aerial surveillance aircraft to test resulting smoke from the fires at Arkema. EPA's plane instrumentation is capable of measuring 78 different chemicals, including peroxides.

The Airborne Spectral Photometric Environmental Collection Technology (ASPECT) aircraft found no exceedances of the Texas comparison values. ASPECT conducted a screening level assessment to evaluate the unreported or undetected releases of hazardous materials or contaminants at the Arkema plant in Crosby, Texas from August 30, 2017 through September 7, 2017. The screening level results from ASPECT were compared to the ASPECT list of Texas Commission on Environmental Quality (TCEQ) short-term Air Monitoring Comparison Values (AMCVs) and found no exceedances of the short-term AMCVs. In addition, the ASPECT was requested to monitor for peroxide which was the source material for the fire. A copy of the ASPECT report is attached.

The TCEQ has an open investigation into the Arkema incident that will include an evaluation of any impacts due to the fires at the site. Additionally, after the final notifications are received, the TCEQ will evaluate the reported emissions events to determine compliance with applicable rules, permit provisions, and notification and reporting requirements. The TCEQ and Harris County Pollution Control are coordinating post-event monitoring, sampling, and complaint response activities. The U.S. Chemical Safety Board has initiated an investigation, and law enforcement continues to limit access to the Arkema plant in Crosby. For more information regarding Arkema, please visit <https://www.tceq.texas.gov/news/statement/statement-on-arkema-investigation>

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<https://www.tceq.texas.gov/news/statement/statement-on-arkema-investigation>

Arkema
Surface Water Run-Off Sampling Results - VOCs
9/1/2017

Sample Number:	HH01-01-01-170901-21	HH01-01-02-170901-21	HH01-01-03-170901-21	HH01-01-03-170901-22	HH01-01-04-170901-21	HH01-01-05-170901-21							
Sampling Location:	B-01	B-02	B-03	B-03	B-04	B-05							
Matrix:	Water	Water	Water	Water	Water	Water							
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L							
Date Sampled:	9/1/2017	9/1/2017	9/1/2017	9/1/2017	9/1/2017	9/1/2017							
Date Analyzed:	9/2/2017	9/2/2017	9/2/2017	9/2/2017	9/2/2017	9/2/2017							
Parameter	2017 EPA Tap Water RML	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
1,1,1-Trichloroethane	24000	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,1,2,2-Tetrachloroethane	7.6	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,1,2-Trichloroethane	1.2	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,1-Dichloroethane	280	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,1-Dichloroethene	850	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,2,3-Trichlorobenzene	21	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,2,4-Trichlorobenzene	12	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,2-Dibromo-3-chloropropane	0.033	5 UJ		5 UJ		5 UJ		5 UJ		5 UJ		5 UJ	
1,2-Dibromoethane	0.75	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,2-Dichlorobenzene	910	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,2-Dichloroethane	17	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,2-Dichloropropane	14	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,3-Dichlorobenzene	14	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
1,4-Dichlorobenzene	48	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
2-Butanone	17000	10 UJ		10 UJ		10 UJ		10 UJ		10 UJ		10 UJ	
2-Hexanone	110	10 UJ		10 UJ		10 UJ		10 UJ		10 UJ		10 UJ	
4-Methyl-2-pentanone	19000	10 UJ		10 UJ		10 UJ		10 UJ		10 UJ		10 UJ	
Acetone	42000	10 UJ		10 UJ		10 UJ		10 UJ		10 UJ		10 UJ	
Benzene	46	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Bromochloromethane	250	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Bromodichloromethane	13	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Bromoform	330	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Bromomethane	23	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Carbon tetrachloride	46	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Chlorobenzene	230	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Chloroethane	63000	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Chloroform	22	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Chloromethane	560	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
cis-1,2-Dichloroethene	110	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
cis-1,3-Dichloropropene	-	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Dibromochloromethane	87	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Dichlorodifluoromethane	590	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Ethylbenzene	150	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Isopropylbenzene	1400	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
m,p-Xylene	580	4 UJ		4 UJ		4 UJ		4 UJ		4 UJ		4 UJ	
Methyl tert-butyl ether	1400	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Methylene chloride	320	5 UJ		5 UJ		5 UJ		5 UJ		5 UJ		5 UJ	
o-Xylene	580	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Styrene	3600	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Tetrachloroethene	120	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Toluene	3300	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
trans-1,2-Dichloroethene	1100	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
trans-1,3-Dichloropropene	-	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Trichloroethene	8.5	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Trichlorofluoromethane	15000	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Vinyl chloride	1.9	2 UJ		2 UJ		2 UJ		2 UJ		2 UJ		2 UJ	
Xylene (total)	580	6 UJ		6 UJ		6 UJ		6 UJ		6 UJ		6 UJ	

RML = Removal Management Level (Cancer risk = 1E-04; THQ = 3.0)

THQ = Toxicity Hazard Quotient

UJ = Analyte not detected above its reporting limit. Concentration estimated.

Arkema
Surface Water Run-Off Sampling Results - SVOCs
9/1/17

Sample Number:	HH01-01-01-170901-21	HH01-01-02-170901-21	HH01-01-03-170901-21	HH01-01-03-170901-22	HH01-01-04-170901-21	HH01-01-05-170901-21									
Sampling Location:	B-01	B-02	B-03	B-03	B-04	B-05									
Matrix:	Water	Water	Water	Water	Water	Water									
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L									
Date Sampled:	9/1/2017	9/1/2017	9/1/2017	9/1/2017	9/1/2017	9/1/2017									
Date Analyzed:	9/2/2017	9/2/2017	9/2/2017	9/2/2017	9/2/2017	9/2/2017									
Parameter	2017 EPA Tap Water RML	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
2,2'-Oxybis(1-chloropropane)	2100	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
2,4,5-Trichlorophenol	3500	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
2,4,6-Trichlorophenol	36	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
2,4-Dichlorophenol	140	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
2,4-Dimethylphenol	1100	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
2,4-Dinitrophenol	120	100	UJ	100	UJ	100	R	100	UJ	100	UJ	100	UJ	100	UJ
2,4-Dinitrotoluene	24	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
2,6-Dinitrotoluene	4.9	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
2-Chloronaphthalene	2200	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
2-Chlorophenol	270	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
2-Methylnaphthalene	110	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
2-Methylphenol	2800	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
2-Nitroaniline	570	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
2-Nitrophenol	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
3-Nitroaniline	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
4,6-Dinitro-2-methylphenol	4.5	50	UJ	50	UJ	50	R	50	UJ	50	UJ	50	UJ	50	UJ
4-Bromophenyl-phenylether	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
4-Chloro-3-methylphenol	4300	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
4-Chloroaniline	37	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
4-Chlorophenyl-phenylether	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
4-Nitroaniline	230	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ
4-Nitrophenol	-			50	UJ	50	UJ	50	R	50	UJ	50	UJ	50	UJ
Acenaphthene	1600	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Acenaphthylene	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Anthracene	5300	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Benzo(a)anthracene	3	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Benzo(a)pyrene	2.5	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Benzo(b)fluoranthene	25	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Benzo(g,h,i)perylene	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Benzo(k)fluoranthene	250	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Bis(2-chloroethoxy)methane	180	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Bis(2-chloroethyl)ether	1.4	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Bis(2-ethylhexyl)phthalate	560	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ
Butyl benzylphthalate	1600	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Carbazole	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Chrysene	2500	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Dibenzo(a,h)anthracene	2.5	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Dibenzofuran	24	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Diethylphthalate	45000	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ
Dimethylphthalate	-			50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ
Di-n-butylphthalate	2700	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ
Di-n-octylphthalate	600	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ	50	UJ
Fluoranthene	2400	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Fluorene	880	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Hexachlorobenzene	0.98	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Hexachlorobutadiene	14	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Hexachlorocyclopentadiene	1.2	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Hexachloroethane	19	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Inden(1,2,3-cd)pyrene	25	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Isophorone	7800	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Naphthalene	17	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Nitrobenzene	14	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
N-Nitroso-di-n-propylamine	1.1	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Pentachlorophenol	4.1	50	UJ	50	UJ	50	R	50	UJ	50	UJ	50	UJ	50	UJ
Phenanthrene	-			25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ
Phenol	17000	25	UJ	25	UJ	25	R	25	UJ	25	UJ	25	UJ	25	UJ
Pyrene	360	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ	25	UJ

R = Reported value is "rejected." The sample results are rejected due to serious deficiencies in meeting QC criteria. The data are unusable. The analyte may or may not be present in the sample.

RML = Removal Management Level (Cancer risk = 1E-04; THQ = 3.0)

THQ = Toxicity Hazard Quotient

UJ = The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.



2017 Hurricane Harvey Deployment
Arkema Site and Rapid Needs Assessment Positive Chemical Detections
9/7/2017 6:06:38 PM



Date	Flight #	Primary Mission	Compound	Limit of Detection (ppm)	Detections*
8/29	1	Systems Check			
8/30	2	Arkema Site	No Detections		
8/31	3	Arkema Site	No Detections		
8/31	4	Arkema Site	Peroxide* (Arkema)	5.3	Trace (6.3*)
8/31	5	Arkema Site	Peroxide* (Arkema)	5.3	Trace (6.3*)
9/1	6	Arkema Site	No Detections		
9/1	7	Arkema Site & Zone 5 RNA	Peroxide* (Arkema)	5.3	Trace (6.3*), multiple passes
9/1	8	Arkema Site (Fires)	Peroxide* (Arkema)	5.3	Trace (6.3*), multiple passes
9/2	9	Arkema Site & Zones 5 & 6 RNA	No Detections		
9/2	10	Arkema Site & Zone 6 RNA	Peroxide* (Arkema)	5.3	Trace (6.3*), multiple passes
9/2	11	Arkema Site	Peroxide* (Arkema)	5.3	Trace (6.3*)
9/3	12	Arkema Site Zone 6 & 7 RNA	Arkema: Peroxide Zone 6: 1-butene	5.3 12.0	Trace (6.3*) Trace (13*)
9/3	13	Arkema Site	Peroxide	5.3	7.7 ppm (max)
9/4	14	Zone 7 RNA	No Detections		
9/4	15	Zone 4 RNA	1-butene	12.0	Trace (13*)
9/5	16	Zone 4 RNA	No Detections		
9/5	17	Zone 4 RNA	No Detections		
9/6	18	Zone 10 RNA	No Detections		
9/6	19	Zone 8 RNA	1-butene	12.0	Trace (13*)

* "Trace" detection represents a value slightly above (about 1 ppm) the limit of detection. Peroxide measurements are being reported as requested by the Environmental Unit. These measurements are associated with the Arkema site and were obtained before, during, and after the trailers burned.



2017 Hurricane Harvey Deployment
Arkema Site and Rapid Needs Assessment Positive Chemical Detections
9/7/2017 6:06:38 PM



The table below lists the chemical compounds that are included in the TCEQ short-term AMCV spreadsheet and in the ASPECT automated detection library. The ASPECT automated processing chemical detection algorithms look for every compound listed in the table but only report positive detections.

Chemical Compounds	Short-term AMCV (ppm)	ASPECT Detection Limit (ppm)*
1,1-dichloroethane	1.0	0.8
1-butene	27	12
acetone	11	5.6
dichlorodifluoromethane	10	0.7
ethyl acetate	4	0.8
ethylene	500	5
isobutane	33	15
methyl ethyl ketone	20	7.5
methylene chloride	3.4	1.1
n-butyl acetate	7.4	3.8
n-propyl acetate	2	0.7
propylene	Simple Asphyxiant	3.7
v vinyl chloride	27	0.6

* The concentration limits are derived using a 10 meter plume path length.